

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE ALLOWABLE SUBJECT MATTER

The Examiner's indication of the allowability of the subject matter of claims 10-13, 17-19, 22-24 and 27-29 is respectfully acknowledged. These claims, however, have not been rewritten in independent form at this time since, as set forth in detail hereinbelow, it is respectfully submitted that their respective parent claims, as amended, now also recite allowable subject matter.

THE CLAIM AMENDMENTS

Claims 1-34 have been amended to more clearly recite the distinguishing features of the present invention in a manner which better complies with the requirements of 35 USC 112, second paragraph.

More specifically, independent claims 1 and 15 have been amended to recite "means for detecting an inclination angle of the document positioning member with respect to a main body of the image reading apparatus, and for storing inclination information based on the detected inclination angle of the document positioning member" and "a correcting device for correcting an inclination angle of the image read by the image

reading device in accordance with the stored inclination information".

In a similar manner, independent claims 5 and 20 have been amended to recite "means for detecting an inclination angle of a test pattern image fed by the document feeder and stopped on the document holder, and for storing inclination information based on the detected information angle" and "a correcting device for correcting an inclination angle of the image read by the image reading device in accordance with the stored inclination information".

In addition, claims 9 and 25 have been amended to be rewritten in independent form as well as to reflect the above described amendments to claims 1, 5, 15 and 20.

And still further, independent claim 30 has been amended to recite "means for detecting a distortion of a test pattern image fed by the document feeder and stopped at the image reading position, and for storing distortion information based on the detected distortion" and "a correcting device for correcting a distortion of the image read by the image reading device in accordance with the stored distortion information".

It is respectfully submitted that the amendments to claims 1 and 15 (and 9 and 25) are supported by the disclosure in the specification at page 18, lines 11-18 and page 19, lines 7-15, and that the amendments to claims 5, 20 and 30 (and 9 and 25) are supported by the disclosure in the specification at page 33, line 1 through page 34, line 19. In addition, it is respectfully

submitted that the amended claims are in full compliance with the requirements of 35 USC 112, second paragraph.

Accordingly, it is respectfully requested that the amendments to the claims be approved and entered, and that the rejection of the claims under 35 USC 112, second paragraph, be withdrawn.

THE PRIOR ART REJECTION

Claims 1-9, 15-16, 21-21, 25-26 and 30-34 were rejected under 35 USC 103 as being obvious in view of the combination of USP 5,211,386 ("Baba") and USP 5,181,260 ("Kurosu et al"). This rejection, however, is respectfully traversed with respect to the claims as amended hereinabove.

As recognized by the Examiner, Baba discloses an image forming device which fails to include "a correcting device" for correcting an inclination of images. For this reason, the Examiner has cited Kurosu et al as disclosing "a correcting device" corresponding to the correcting device of the claimed present invention.

It is respectfully submitted, however, that the correcting technique disclosed in Kurosu et al is very different from the technique effected by the correcting device of the claimed present invention, as will be explained in detail hereinbelow.

According to the teachings of Kurosu et al, a method for detecting an amount of a skew of an image at high speed with an automatic paper feeding device is provided whereby in a first

skew angle measuring unit 3, the skew of a temporarily stored digital image is measured within a narrow range of angles upon which the distribution of skew of inputted images are concentrated. Then, the peak of the calculated integration value is obtained. If there exists a peak value, a skew angle detection signal is transmitted to the second skew angle measuring unit 4, while an angle value equivalent to the peak is outputted to the selecting unit 5. In a second skew angle measuring unit 4, moreover, measurement is performed over a wide range of angles in which the distribution of skew of the inputted image can exist, according to the absence of the skew angle detection signal in the first measurement. Specifically, if the skew angle detection signal is inputted, the angle of skew is already determined, and therefore the second measurement is not made. Reversely, if the skew angle detection signal is not present, searching is performed over the wide range of angle. (See the disclosure in Kurosu et al at column 6, line 61 through column 7, line 38.)

Thus, according to the teachings of Kurosu et al, every time that a digital image corresponding to an image to be printed is inputted, the skew of the digital image is measured only within the narrow range of angles upon which the distribution of skew of inputted images are concentrated or additionally over the wide range of angle in which the distribution skew of the inputted image can exist.

By contrast, according to the present invention as recited in amended independent claims 1 and 15, once the "inclination angle" of the document positioning member is detected and inclination information based thereon is stored, the same inherent inclination information relating to the "inclination angle" which has been stored is applied to any document image even if different document images are used for recording on a specific apparatus.

Similarly, according to the present invention as recited in amended independent claims 5 and 20, once the "inclination angle" of a test pattern image is detected and inclination information based thereon is stored, the same inherent inclination information relating to the "inclination angle" which has been stored is applied to any document image even if different document images are used for recording on a specific apparatus.

Amended independent claims 9 and 25, moreover, recite the same above described features of the present invention.

And according to the present invention as recited in amended independent claim 30, once the "distortion" of a test pattern image is detected and inclination information based thereon is stored, the same inherent inclination information relating to the "distortion" which has been stored is applied to any document image even if the different document images are used for recording on a specific apparatus.

Thus, according to the structure of the claimed present invention, an accurate image which is free from inclination

and/or distortion can be formed for both manual placing and automatic document feeding, when neither fine adjustment of the document position nor adjustment for the slip of the conveyance system of a document feeder is needed. (See the disclosure in the specification of the present application at page 37, lines 8-13.)

On the other hand, according to the method for detecting the amount of skew of an image disclosed in Kurosu et al, since the period of time required for detection of the amount of skew differs for each document image to be printed (because the measurement is performed within a narrow range of angles and/or in a wider range of angles), the printing speed also differs from each document image.

Accordingly, it is respectfully submitted that Kurosu et al does not at all disclose, teach or suggest the above described structural features and advantageous effects achieved by the "correcting device" of the present invention as recited in the amended claims. And it is therefore respectfully submitted that even if the teachings of Baba and Kurosu et al were combinable in the manner suggested by the Examiner, the above described structural features and advantageous effects of the present invention as recited in the amended claims would still not be achieved or rendered obvious.

In view of the foregoing, it is respectfully submitted that the present invention as recited in each of amended independent

claims 1, 5, 9, 15, 20, 25 and 30, as well as each of amended claims 2-4, 6-8, 10-14, 16-19, 21-24, 26-29 and 31-34 respectively depending therefrom, clearly patentably distinguishes over the combination of Baba and Kurosu et al under 35 USC 103.

CLAIM FEE

The application was originally filed with 34 claims of which 5 were independent, and the appropriate claim fee was paid for such claims. The application again contains 34 claims, of which 7 are now independent. Accordingly, a claim fee in the amount of \$160.00 for the addition of 2 extra independent claims is attached hereto. In addition, authorization is hereby given to charge any additional fees which may be determined to be required to Account No. 06-1378.

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In view of the foregoing, entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



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VERSION OF CLAIMS SHOWING CHANGES MADE

1. (Amended) An image reading apparatus, comprising:
a document holder on which a document is placed;
a document positioning member[, wherein] with reference
to which the document is positioned on the document holder
5 [according to the document positioning member];
means for detecting an inclination angle of the
document positioning member with respect to a main body of the
image reading apparatus, and for storing inclination information
based on the detected inclination angle of the document
10 positioning member;
an image reading device for reading an image of the
document positioned on the document holder; and
a correcting device for correcting an inclination angle
of the image read by the image reading device [according to an]
15 in accordance with the stored inclination information [of the
document positioning member,
wherein the inclination of the document positioning member
is an inclination on the document holder for a primary scanning
direction].

2. (Amended) The image reading apparatus of claim 1,
[further comprising

a memory for storing inclination information based on the
inclination of the document positioning member;]

5 wherein the [correcting device corrects the inclination of
the image read by the image reading device according to the
inclination information] means for storing the inclination
information comprises a memory.

3. (Amended) The image reading apparatus of claim 2,
further comprising an inputting device for inputting the
inclination information to the memory.

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4. (Amended) The image reading apparatus of claim 3,
5 wherein the inputting device [connects] is connected to an
outside inputting device, and the inputting device receives the
inclination information from the outside inputting device.

5. (Amended) An image reading apparatus comprising:
a document holder on which a document is placed;
a document feeder for feeding the document in a feeding
direction and stopping the document on the document holder;
5 means for detecting an inclination angle of a test
pattern image fed by the document feeder and stopped on the
document holder, and for storing inclination information based on
the detected inclination angle;

10 an image reading device for reading an image of the
document stopped on the document holder, wherein the image
reading device moves in a sub-scanning direction so as to read
the image; and

15 a correcting device for correcting an inclination angle
of the image read by the image reading device [according to an
inclination of the feeding direction by the document feeder,
wherein the inclination of the feeding direction is an
inclination on the document holder for the sub-scanning
direction] in accordance with the stored inclination information.

6. (Amended) The image reading apparatus of claim 5,
[further comprising a memory] wherein the means for storing [the]
inclination information [based on the inclination of the feeding
direction by the document feeder, wherein the correcting device
5 corrects the inclination of the image read by the image reading
device according to the inclination information] comprises a
memory.

7. (Amended) The image reading apparatus of claim 6,
further comprising an inputting device for inputting the
inclination information to the memory.

8. (Amended) The image reading apparatus of claim 7, wherein the inputting device [is connected] connects to an outside inputting device, and the inputting device receives the inclination information from the outside inputting device.

9. (Amended) [The] An image reading apparatus [of claim 5 further] comprising [a document positioning member, wherein the document is positioned on the document holder according to the document positioning member]:

5 a document holder on which a document is placed;
 a document feeder for feeding the document in a feeding
direction and stopping the document on the document holder;

means for detecting an inclination angle of a test
pattern image fed by the document feeder and stopped on the
10 document holder, and for first storing inclination information
based on the detected inclination angle;

a document positioning member with reference to which
the document is positioned on the document holder;

means for detecting an inclination angle of the
15 document positioning member with respect to a main body of the
image reading apparatus, and for storing second inclination
information based on the detected inclination angle of the
document positioning member;

an image reading device for reading an image of the
20 document stopped on the document holder, wherein the image
reading device moves in a sub-scanning direction so as to read
the image; and

a correcting device for correcting an inclination angle
of the image read by the image reading device in accordance with
25 the second inclination information when the document is
positioned on the document holder without being fed by the
document feeder, and for correcting the inclination angle of the
image read by the image reading device in accordance with the

first inclination information when the document is fed and
30 stopped on the document holder by the document feeder

[wherein the correcting device corrects an inclination of the image read by the image reading device according to an inclination of the document positioning member when the document is positioned on the document holder without being fed by the document feeder, and the inclination of the document positioning member is an inclination on the document holder for a primary scanning direction, and

wherein the correcting device corrects the inclination of the image read by the image reading device according to the inclination of the feeding direction by the document feeder when the document is fed and stopped on the document holder by the document feeder].

10. (Amended) The image reading apparatus of claim 9, wherein the means for storing the first inclination information and the means for storing the second inclination comprises at least one memory [further comprising a memory for storing first inclination information based on the inclination of the document positioning member and storing second inclination information based on the inclination of the feeding direction by the document feeder,

wherein the correcting device corrects the inclination of the image read by the image reading device according to the first inclination information when the document is positioned on the document holder without being fed by the document feeder, and the correcting device corrects the inclination of the image read by the image reading device according to the second inclination information when the document is fed and stopped on the document holder by the document feeder].

11. (Amended) The image reading apparatus of claim 10, wherein the at least one memory comprises a first memory for

storing the first inclination information and a second memory for storing the second inclination information.

12. (Amended) The image reading apparatus of claim 10, further comprising an inputting device for inputting the first inclination information and the second inclination information.

13. (Amended) The image reading apparatus of claim 12, wherein the inputting device [connects] is connected to an outside inputting device, and the inputting device receives the inclination information [sent by] from the outside inputting device.

14. (Amended) The image reading apparatus of claim 1, further comprising a document feeder for feeding the document on the document holder and hitting the document against the document positioning member so as to position the document at a predetermined position.

15. (Amended) An image forming apparatus comprising:
a document holder on which a document is placed;
a document positioning member[, wherein] with reference to which the document is positioned on the document holder
[according to the document positioning member];

means for detecting an inclination angle of the document positioning member with respect to a main body of the image reading apparatus, and for storing inclination information based on the detected inclination angle of the document positioning member;

an image reading device for reading an image of the document positioned on the document holder;

a correcting device for correcting an inclination angle of the image read by the image reading device [according to an] in accordance with the stored inclination information [of the document positioning member,

wherein the inclination of the document positioning member is an inclination on the document holder for a primary scanning direction]; and

20 an image recording device for recording the image corrected by the correcting device on a recording material.

16. (Amended) The image forming apparatus of claim 15, further comprising a calculating device for calculating the inclination angle of the image read by the image reading device [so as to calculate the inclination], and wherein the inclination
5 angle of the image read by the image reading device is utilized to detect the inclination angle of the document positioning member.

17. (Amended) The image forming apparatus of claim 16, wherein the image read by the image reading device [comprising]
10 is a test pattern image, and the image reading device comprises:

a plurality of charge coupled [device comprising a plurality of pixels] devices arranged along [the] a primary scanning direction; and

[a] detector for detecting [the] a number of pixels,
15 read by [a test image so as to detect an inclination of the test image read by the image reading device relative to] the plurality of charge coupled devices, of a straight line drawn in a sub-scanning direction [which is] perpendicular to the primary scanning direction on the test pattern image; and

20 wherein the calculating device calculates the detected inclination angle of the document positioning member based on the number of pixels [elements] detected by the detector.

18. (Amended) The image forming apparatus of claim 17, further comprising a test pattern image memory for storing [a] test pattern image data indicating the test pattern image,

5 wherein the test pattern image is recorded by the image recording device based on the test pattern image data [is] and

the test pattern image comprises a straight line which is perpendicular to a predetermined edge of the recording material[,]; and

10 the image reading device reads the straight line of the recording material, recorded by the image recording device based on the image data, positioned on the document holder so that the predetermined edge of the recording material accords with the document positioning member]

15 wherein the image reading device reads the straight line of the test pattern image so that the predetermined edge of the recording material accords with the document positioning member.

19. (Amended) The image forming apparatus of claim 17 [further comprising a memory], wherein the means for storing the inclination information [relating to the inclination of the image calculated by the calculating device] comprises a memory.

20. (Amended) An image forming apparatus comprising:
a document holder on which a document is placed;
a document feeder for feeding the document and stopping the document on the document holder;

5 means for detecting an inclination angle of a test pattern image fed by the document feeder and stopped on the document holder, and for storing inclination information based on the detected information angle;

10 an image reading device for reading an image of the document stopped [on] by the document holder, wherein the image reading device moves [to] in a sub-scanning direction so as to read the image;

15 a correcting device for correcting an inclination angle of the image read by the image reading device [according to an] in accordance with the stored inclination [of the feeding direction by the document feeder, wherein the inclination of the

feeding direction is an inclination on the document holder for the sub-scanning direction] information; and

an image recording device for recording the image corrected by the correcting device on a recording material.

21. (Amended) The image forming apparatus of claim 20, further comprising a calculating device for calculating the inclination angle of the image read by the image reading device so as to calculate an inclination angle of a feeding direction by the document feeder.

22. (Amended) The image forming apparatus of claim 21, wherein the image reading device [comprising] comprises:

a plurality of charge coupled [device] devices arranged along [the] a primary scanning direction; and

a detector for detecting [the] a number of pixels [read a test image], read by the plurality of charge coupled devices, of a straight line drawn in a sub-scanning direction perpendicular to the primary scanning direction on the test pattern image, so as to detect an inclination angle of the test pattern image read by the image reading device [relative to the sub-scanning direction];

wherein the calculating device calculates the detected inclination angle of feeding direction by the document feeder based on the number of pixels detected by the detector.

23. (Amended) The image forming apparatus of claim 22, further comprising a test pattern image memory for storing [a] test pattern image data indicating the test pattern image,

wherein the test pattern image is recorded [on] by the image recording device based on the test pattern image data [is] and the test pattern image comprises a straight line which is perpendicular to a predetermined edge of the recording material[,]; and

10 wherein the image reading device reads the straight
line of the [recording material] test pattern image recorded by
the image recording device based on the test pattern image data
and fed by the document feeder.

24. (Amended) The image forming apparatus of claim 22
[further comprising a memory for storing inclination information
relating to the inclination of the image calculated by the
calculating device] wherein the means for storing the inclination
5 information comprises a memory.

25. (Amended) [The] An image [forming apparatus of
claim 20 further] reading apparatus comprising [a document
positioning member,];
a document holder on which a document is placed;
5 a document feeder for feeding the document in a feeding
direction and stopping the document on the document holder;
means for detecting an inclination angle of a test
pattern image fed by the document feeder and stopped on the
document holder, and for first storing inclination information
10 based on the detected inclination angle;
a document positioning member with reference to which
the document is positioned on the document holder;
means for detecting an inclination angle of the
document positioning member with respect to a main body of the
15 image reading apparatus, and for storing second inclination
information based on the detected inclination angle of the
document positioning member;
an image reading device for reading an image of the
document stopped on the document holder, wherein the image
20 reading device moves in a sub-scanning direction so as to read
the image;
a correcting device for correcting an inclination angle
of the image read by the image reading device in accordance with
the second inclination information when the document is

25 positioned on the document holder without being fed by the
document feeder, and for correcting the inclination angle of the
image read by the image reading device in accordance with the
first inclination information when the document is fed and
stopped on the document holder by the document feeder; and
30 an image recording device for recording the image
corrected by the correcting device on a recording material
[wherein the document is positioned on the document
holder according to the document positioning member,
wherein the correcting device corrects an inclination
35 of the image read by the image reading device according to an
inclination of the document positioning member when the document
is positioned on the document holder without being fed by the
document feeder, and the inclination of the document positioning
member is an inclination on the document holder for a primary
40 scanning direction, and
wherein the correcting device corrects the inclination
of the image read by the image reading device according to the
inclination of the feeding direction by the document feeder when
the document is fed and stopped on the document holder by the
45 document feeder].

26. (Amended) The image forming apparatus of claim 25,
further comprising a calculating device for calculating the
inclination angle of the image [occurred] read by the image
reading device according to the inclination angle of the document
5 positioning member and the feeding direction by the document
feeder.

27. (Amended) The image forming apparatus of claim 26,
wherein the image reading device [comprising] comprises:
a plurality of charge coupled [device] devices arranged
10 along a primary scanning direction; and
a detector for detecting a number of pixels [read a
test image], read by the plurality of charge coupled devices, of

a straight line drawn in a sub-scanning direction perpendicular to the primary scanning direction on the test pattern image, so as to detect an inclination angle of the test pattern image read by the image reading device [relative to the sub-scanning direction];

wherein the calculating device calculates the detected inclination angle of the document positioning member and the feeding direction by the document feeder based on the number of pixels detected by the detector.

28. (Amended) The image forming apparatus of claim 27, further comprising a test pattern image memory for storing test pattern image data indicating the test pattern image,

wherein the test pattern image is recorded by the image recording device based on the test pattern image data [is] and the test pattern image comprises a straight line which is perpendicular to a predetermined edge of the recording material[,]; and

wherein the image reading device reads the straight line of the [recording material, recorded by the image recording device based on the] test pattern image [data, positioned on the document holder] so that the predetermined edge of the recording material accords with the document positioning member, and the image reading device reads the straight line of the [recording material] test pattern image recorded by the image recording device based on the test pattern image data and fed by the document feeder.

29. (Amended) The image forming apparatus of claim 27 [further comprising:

a first memory for storing first inclination information relating to the inclination of the image according to the fixed angle of the document positioning member calculated by the calculating device; and

a second memory for storing second inclination information related to the inclination of the image according to the inclination of the feeding direction by the document feeder calculate by the calculating device]

wherein the means for storing the first inclination information comprises a first memory, and the means for storing the second inclination comprises a second memory.

30. (Amended) An image reading apparatus comprising:
a document holder through which a document passes;
a document feeder for feeding a document to an image reading position on the document holder;
means for detecting a distortion of a test pattern image fed by the document feeder and stopped at the image reading position, and for storing distortion information based on the detected distortion;
an image reading device for reading an image of the document [being fed by the document feeder at] while the document passes through the image reading position; and
a correcting device for correcting a distortion of the image read by the image reading device in accordance with the stored distortion information.

31. (Amended) The image reading apparatus of claim 30, [further comprising a memory for storing distortion information based on the inclination of the feeding direction by the document feeder, wherein the correcting device corrects the distortion of the image read by the image reading device according to the distortion information] wherein the means for storing the distortion information comprises a memory, and wherein the distortion information is calculated based on an inclination angle of a feeding direction by the document feeder.

32. (Amended) The image reading apparatus of claim 31,
further comprising an inputting device for inputting the
distortion information to the memory.

33. (Amended) The image reading apparatus of claim 32,
wherein the inputting device [connects] is connected to an
outside inputting device, and the inputting device receives the
distortion information from the outside inputting device.

34. (Amended) The image reading apparatus of claim 30,
further comprising:

[a document holder on which the document is placed;
and] a document positioning member[,] with reference to which the
5 document is positioned on the document holder; and

[wherein the document is positioned on the document
holder according to the document positioning member;]

means for detecting an inclination angle of the
document positioning member with respect to a main body of the
10 image reading apparatus, and for storing inclination information
based on the detected inclination angle of the document
positioning member;

wherein the correcting device corrects an inclination
angle of the image read by the image reading device [according to
15 an] in accordance with the stored inclination information [of the
document positioning member] when the document is positioned on
the document holder without being fed by the document feeder[.];
and [the inclination of the document positioning member is an
inclination on the document holder for a primary scanning
20 direction; and]

wherein the correcting device corrects the distortion
of the image read by the image reading device [according to] in
accordance with the inclination angle of the feeding direction by
the document feeder when the document is fed by the document
25 feeder to the image reading position.